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(54) **Filler for pillows and the like**

(57) A filler for pillows, cushions, quilts, sleeping bags, ski jackets etc. Comprises a mixture of feathers and fibres having a length of from 1 mm to 40 mm and a diameter of 12 to 32 microns, the fibres comprising from 0.1 to 40% by weight of the mixture. Unbroken feathers, and synthetic fibres such as polyester, polyamide or polyacrylonitrile are preferred.

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## SPECIFICATION

### Filler

5 This invention relates to fillers for quilts, pillows, cushions, sleeping bags, ski jackets and similar articles.

In particular it relates to such fillers composed of feathers and fibres.

10 In the past the best fillers for use in articles of the kind enumerated above have been composed entirely of feathers.

Fillers composed entirely of feathers obtained from water birds, and especially smaller feathers  
15 such as down have resulted in fillers having excellent resilience.

Fillers for use in articles of these kinds desirably have a number of qualities. The filler must exhibit resilience and be capable of a plump configuration.  
20 The resilience must be durable and consequently the filler must resist matting. It must have excellent thermal insulation properties. Preferably it should have capacity to absorb moisture reversibly and should have a relatively low weight per unit volume.

25 The desired combination of properties, while difficult to quantify, is readily recognized by those skilled in the art of manufacturing such fillers and by consumers.

In the past the most acceptable fillers have been  
30 those comprised entirely from feathers, in particular those obtained from water fowl and in particular the smaller feathers such as down rather than wing and tail feathers of water fowl. Indeed the best fillers have traditionally been composed entirely of the  
35 down feathers of a particular water fowl, the eider duck.

Hitherto fillers composed entirely of feathers and down have been impossible to match by other fillers while retaining the desired performance characteristics.  
40

The primary object of this invention is the provision of a filler material which while having substantially the same performance characteristics of known fillers consisting entirely of water fowl down  
45 and feathers, is capable of production in great volume at significantly lower cost.

Attempts to provide a filler material of reduced cost by the partial substitution of man made fibres are known in the prior art. Thus, for example, Frederick U.S. Patent 2,684,337 describes the production of a filler or batt by the intermixture in equal proportions of a feather product and staple length  
50 filaments of polyethylene terephthalate. The material thus produced does not, however, reproduce the main properties of water fowl down or water fowl down and feather mixtures, and has a strong wadding character which is quite undesirable in applications such as quilts and pillows.

Other prior art proposals for mixtures of synthetic  
60 fibre and down or feather products have produced batting or textile like materials unsuitable for bedding purposes.

For the purposes of this specification the term "fibres" embraces filaments such as synthetically  
65 manufactured fibres and the term "feathers"

includes the term "down".

According to a first aspect, the invention consists in a filler comprising a substantially homogeneous mixture of feathers and of fibres as herein defined,  
70 said fibres having a mean length of from 1 mm to 40 mm and a mean diameter of 12 to 32 microns, said fibres comprising from 0.1% to 40% by weight of said mixture.

According to a second aspect the invention is a  
75 method of manufacture of a filler consisting in blending from 0.1% to 40% by weight of fibres as herein defined, having an average fibre length of from 1 mm to 40 mm and an average fibre diameter of from 12 to 32 microns with from 99.9% to 60% by weight  
80 of feathers by blending means whereby a substantially homogeneous distribution of fibres amongst feathers is produced.

According to one embodiment crimped synthetic fibres in the form of a batt are further formed into a  
85 rope, cut into small filaments, and mixed with feathers or down.

The choice of feathers is determined by the end use of the filler. Thus while land fowl feathers may be employed in conjunction with the added fibre for  
90 cushion fillings, these should not be used in bedding applications in view of their inadequate heat insulating properties, and use of water fowl feathers is preferred. For bedding application use of wing and tail feathers are also undesirable although a mixture of  
95 these with body feathers or down may be used for economic reasons.

Preferably unbroken feathers are used.

For other end uses feathers may be chosen in accord with normal practice for such end uses.

100 While a satisfactory product can be obtained using fibres of average length between 1 mm and 40 mm, the best results are obtained when the average length of fibre added corresponds approximately to the average length of feathers employed. Accordingly, the fibre length should average between 20  
105 mm and 40 mm for optimum results.

While in the present example fibres of the desired length are obtained by forming a batt into a rope and chopping the rope by guillotine or shears to the  
110 required average lengths, length reduction may be effected by guillotining the batt directly or by use of other means such as rotary cutters or staple fibres having the desired average length may be chosen as a starting material.

115 Among synthetic fibres those which have given the best results are polyester, polyamide and polyacrylo nitrile fibres.

Although other synthetic fibres can be used, fibres which are resilient are preferred and of these fibres  
120 which tend to adopt a curled configuration in short staple length are especially suitable.

Fibres which are crimped or capable of being crimped tend to adopt a curled configuration of the desirable type.

125 The average fibre diameter should be in the range 12 to 32 microns to give fillings of the desired characteristics.

Among non-synthetic fibres the best results have been obtained with wool.

130 Wool is naturally crimped and tends to adopt a

curled or helical configuration.

In addition it has reversible moisture absorption properties which make it the preferred fibre for use when the filling is to be used in bedding applications.

5 When wool is used the fibres should be separated by a combing operation and tops provide a good starting material. The tops can be conveniently cut to yield the average fibre lengths of 1 mm to 40 mm as previously described.

10 If French noils are used the fibre lengths are approximately 3 cm and are within the required range of lengths and it is merely desirable to loosen the fibres by teasing or by blowing with air.

For economic reasons it is generally desirable to 15 add as much fibre as possible to the mixture consistent with retaining acceptable properties of the filling.

It has been found that if the proportion of fibre in the mixture exceeds 40% by weight of the mixture, 20 then the resulting filling has a tendency to matt and is unsatisfactory. Smaller proportions of fibre can of course be used but with correspondingly lesser economic advantage.

French noils are preferred as the fibre for bedding 25 applications.

When wool is used as the fibre, the fibre component should not exceed 30% by weight for optimum results.

It is important that the feathers and fibres be 30 mixed so as to produce a homogeneous blend of feathers and fibres.

Preferably the blend should result in random orientation of fibres with respect to feathers, and

preferably the mixing process should not result in 35 breakage of feathers or should minimise damage to them.

This is not easily achieved.

In the best method presently known the blending is achieved in an automatic mixing machine model 40 ML 1/1 manufactured by L.H. Lorch Maschinen Fabrik of West Germany. This machine has two functions. One function is the opening and loosening of the fibre, and the other one the mixing process itself.

The mixing procedure is accomplished by flexible 45 stirring arms and pneumatic circulation at the same time. This machinery results in a uniform distribution of fibres amongst feathers and a random orientation.

Addition of a small quantity of down fibre or fly to 50 the mixer assists in obtaining a homogeneous mixture by attracting added fibres.

In view of the relative failure of prior art to combine fibres with feathers the product according to the present invention is surprisingly successful.

55 This is exemplified by filling having the composition shown in Table I in comparison with a control comprised solely of feathers.

Sample cushions made using fillings according to the invention were found to be practically inter- 60 changeable and indeed the resilience of cushions made with several fillings were judged superior to the control filled with natural product alone.

As is apparent, blends of wool and synthetic fibres may be substituted for wool or synthetic fibre alone 65 in the fibre/feather blend with equally satisfactory result.

TABLE I

Sample No.	% by weight Feathers and Down	% by weight Fibre in Filling	Fibre Type	Ave. Fibre Length (mm)	Ave. Fibre Diameter (microns)	Result
0	100	0	—	—	—	Control
1	60	40	Dacron (2) Polyester	30	14	S
2	50	50	"	"	"	P
3	80	20	"	"	"	C
4	90	10	"	"	"	C
5	99	1	"	"	"	C
6	60	40	"	40	"	C or S
7	60	40	"	4	"	C
8	60	40	"	30	12.4	C
9	60	40	"	30	32	C
10	60	40	"	30	3.0, 17.5	C
11	60	40	Polyamide	30	14	S
12	60	40	Polyacrylonitrile	30	14	S
13	60	40	Wool Tops	30	20	C
14	60	40	Wool Tops	30	28	P
15	70	30	Wool Tops	40	20	S
16	70	30	Wool Noils	30	20	S
17	70	30	Wool Noils	30	28	S
18	70	30	Wool: Polyester blend (1:1 weight)	30	Wool 20 Polyester 14	C

## Notes:

- (1) The feathers and down used were a mixture typical of those employed for bedding application.  
 (2) DACRON is a Registered Trade Mark.  
 (3) The results were judged in comparison with the control as "Superior" designated A; "Comparable", that is to say substantially indistinguishable, designated C; or "Poorer" designated P.

## CLAIMS

1. A filler comprising a substantially homogeneous mixture of feathers and of fibres as herein defined, said fibres having a mean length of from 4 mm to 40 mm and a mean diameter of 12 to 32 microns wherein said fibres comprise from 0.1% to 40% by weight of said mixture.
2. A filler according to claim 1 wherein said fibres have a mean diameter of from 12.5 to 20 microns.
3. A filler according to claim 1 or claim 2 wherein said fibres are characterised as tending to adopt a curled configuration.
4. A filler according to claim 1 or claim 2 wherein said fibres are characterised as being crimped or crimpable.
5. A filler according to any one of the preceding claims wherein said fibres are polyester fibres.
6. A filler according to any one of claims 1 to 4 wherein said fibres are polyamide fibres.
7. A filler according to any one of claims 1 to 4 wherein said fibres are polyacrylonitrile fibres.
8. A filler according to any one of claims 1 to 4 wherein said fibres are wool fibres.
9. A filler according to any one of claims 1 to 4 wherein said fibres are wool noils.
10. A filler according to any one of claims 1 to 4

wherein said fibres are a blend of one or more fibres selected from the group consisting of polyester, polyamide polyacrylonitrile, and wool fibres with one or more other fibres chosen from said group.

11. A filler according to any one of the preceding claims wherein said feathers are substantially unbroken.

12. A filler according to any one of the preceding claims characterised in that said fibres are substantially randomly orientated with respect to said feathers.

13. A filler according to any one of the preceding claims wherein said fibres have an average fibre length of from 20 mm to 40 mm.

14. A method of manufacture of a filler consisting in blending from 0.1% to 40% by weight of fibres as herein defined having an average fibre length of from 1 mm to 40 mm, and an average fibre diameter of from 12 to 32 microns with from 99.9% to 60.0% by weight of feathers by blending means whereby a substantially homogeneous distribution of fibres amongst feathers is produced.

15. A method of manufacture of a filler consisting of a process according to claim 13 wherein said blending means produces a substantially random orientation of said fibres with respect to said feathers.